Haier SERVICE MANUAL

Order No. Ref1012S008V0

Refrigerator

MODEL: HB21FSSAA
HB21FGRAA
HB21FGBAA
HB21FGWAA

WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings and cautions to advice non-technical individuals of potential dangers in attempting to service a product. Product powered by electricity should by serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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Haier Group

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Chapter 1 General Information

1-1. General Guidelines

When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

1) Leakage Current Cold Check
2) Leakage Current Hot Check
3) Prevention of Electro Static Discharge (ESD) to Electrostatic Sensitive

1-2. Insurance test

1. Check if there is any leak of current.
2. Cut out the power supply before the repair to avoid an electrical shock hazard.
3. In the case of a live-line test, insulating gloves should be worn to avoid potential electrical shock.
4. Confirm the rated current, voltage and capacity before testing with any kinds of instruments.
5. Watch if the upper door is open when you check something at a lower position.
6. Take out every part in the cabinet before moving the machine, especially things like panels (e.g. glass shelf).
7. Please wear intact cotton gloves when repair any parts of the evaporator, so that scratches by the sharp fins can be avoided.
8. If there is a breakdown with the refrigeration system, please surrender the machine to the service center, else the leaked refrigerant may pollute the atmosphere.
9. The refrigerator use AC of 220V with a frequency of 50～60Hz.
10. A big fluctuation of voltage (exceed the range 187～242V) may cause a start failure of the refrigerator, a burn-out of the control panel and compressor, or an abnormal sound from the compressor in operation. In this condition an automatic voltage regulator over 750W should be added.
11. Take care not to damage the supply line. Don’t yank at the line; pull the plug out gently from the receptacle. Don’t press the line under the cabinet or step on it. Take care not to roll on or damage the supply line when moves the machine from the wall.
12. In the case of leakage of inflammable gases like carbon monoxide, open the door and windows. Don’t pull out or insert the plugs of the appliance.
13. Don’t touch the refrigeration surface of the freezing compartment when the refrigerator is in operation, especially when your hand is wet, else you may be glued to the surface.
14. Pull out the plug of power supply during clearance or power outage. Wait at least five minutes to resume the power supply in order to prevent damage to the compressor caused by continuous restart.

Photo used in this manual

The illustration and photos used in this Manual may not base on the final design of products, which may differ from your products in some way.

1-3. How to read this Service Manual

1-3-1. Using Icons

The meaning of each icon is described in the table below:

Note:

A “note” provides information that is not indispensable.

Caution:

A “caution” is used when there is danger, through incorrect manipulation, may damage equipment, loose data, get an unexpected result or has to restart (part of) a procedure.

Warning:

A “warning” is used when there is danger of personal injury.

Reference:

A “reference” guides to find additional information on a specific topic.

Chapter 2 Product Feature

2-1. Specifications

	Model	HB21FSSAA	HB21FGRAA	HB21FGBAA	HB21FGWAA
	Sketch				
	Product description (Refrigerator/Freezer)	Refrigerator	Refrigerator	Refrigerator	Refrigerator
	Type of appliance (FS= freestanding/BI= built-in)	FS	FS	FS	FS
	Type of cooling system(NF=no frost/ S=static)	NF	NF	NF	NF
	Climate class*	SN N ST T	SN N ST T	SN N ST T	SN N ST T
	Freezer compartment / Star rating	4*	4*	4*	4*
2	Key features				
	Gross capacity	635L	635L	635L	635L
	Total net capacity	543L	543L	543L	543L
	Net capacity refrigerator compartment	394L	394L	394L	394L
	Net capacity freezer compartment /ice compartment	149L	149L	149L	149L
	Freezing capacity	10kg	10kg	10kg	10kg
	Energy consumption / year	432kWh	432kWh	432kWh	432kWh
	Max storage time at breakdown *Freezer*	720Min	720Min	720Min	720Min
	Defrosting (M=manual A=automatic)	A	A	A	A
	Frost free system	yes	yes	yes	yes
	Defrost water outlet	yes	yes	yes	yes
	Air circulating ventilator	yes	yes	yes	yes
	Kind of coolant (R134a/R600a)	R600a/ 75g	R600a/ 75g	R600a/ 75g	R600a/ 75g
3	Technical data				
	Voltage / frequency	220-240~V/ 50Hz	220-240~V/ 50Hz	220-240~V/ 50Hz	220-240~V/ 50Hz
	Protection calss	I	I	I	I
	Input power	150 W	150 W	150 W	150 W
	Rated current	1.5 A	1.5 A	1.5 A	1.5 A
	Defrost watt	180 W	180 W	180 W	180 W
	Max power of lamp	8 W	8 W	8 W	8 W
	Temperature range (from>to)				
	Refrigerator	2-10°C	2-10°C	2-10°C	2-10°C
	Freezer	-16 ~-26°C	-16 ~-26°C	-16 ~-26°C	-16 ~-26°C
	Refrigerating capacity	10kg/24h	10kg/24h	10kg/24h	10kg/24h
	Features:				
	Cooling system: K=Compressor / A=Absorption	K	K	K	K

4	Aesthetics				
	Colors: W=white G=silver gray B=Obsidian SS=stainless steel	Stainless Steel	RED	BLACK	WHITE
	Fascia panel / Handle (w / c)	G/G	G/G	G/G	G/G
	F= flat / R= rounded / S= streamline	R	R	R	R
	Inside colour	W	w	w	w
	Compartments number	2n°	2n°	2n°	2n°
	Bottle compartment	6n°	6n°	6n°	6n°
	Hinged (r =right l =left) / reversible	r / X	r / X	r / X	r / X
	Shelves:				
	Number Fridge / Freezer	3 / -	3 / -	3 / -	3 / -
	Type (gr=grill / g=glass / p=plastic)	*g*	g	g	g
	Color w-white / b=blue / t=transparent.	*t*	t	t	t
	Adjustable (Y=yes / N=not)	*y*	*y*	*y*	*y*
	Foldable Shelf	yes	yes	yes	yes
	Bottle Rack	yes	yes	yes	yes
	Drawers:				
	Plastic drawers (fully freezing comp.)	3n°.	3n°.	3n°.	3n°.
	Colour of drawer (w=white/t=transp./g=green)	t	t	t	t
	Crisper:				
	Chiller / Meat (salad crisper) transparent / white	Chiller (t)	Chiller (t)	Chiller (t)	Chiller (t)
	Vegetable crisper(s) transparent / white	t	t	t	t
5	Equipment & accessories				
	Control panel				
	Interior / exterior	Exterior	Exterior	Exterior	Exterior
	Thermometer interior / exterior	Interior	Interior	Interior	Interior
	Display type	LCD	LCD	LCD	LCD
	Control lamps green / yellow /white	W	W	W	W
	Over temperature alarm LED / acoustic	acoustic	acoustic	acoustic	acoustic
	Adjustable thermostat	yes	yes	yes	yes
	Fast freeze switch /-function	yes	yes	yes	yes
	Deodorizing	yes	yes	yes	yes
	Interior light	yes	yes	yes	yes
	LED light	Full	Full	Full	Full
	Freeze pack(s)	2n°	2n°	2n°	2n°
	ice maker Manual/ Automatic	M	M	M	M
	Ice cube tray(s)	1n°	1n°	1n°	1n°
	Butter holder	yes	yes	yes	yes
	Egg trays	2	2	2	2
	Adjustable feet front / rear	2n°	2n°	2n°	2n°
	Length of cable/incl. plug	200cm	200cm	200cm	200cm
	Condenser Back wall / Integrated	I	I	I	I

6	Product dimensions				
	Unit dimensions (*H / W / D mm)*	1780*910*770	1780*910*770	1780*910*770	1780*910*770
	Depth Without handle	700mm	700mm	700mm	700mm
	Depth with open door	1080mm	1080mm	1080mm	1080mm
	Door open angle	<135	<135	<135	<135
	Net weight	141kg	152KG	152KG	152KG
7	Packing dimensions & load ability				
	Packing dimensions (*H / W / D mm)*	1860*980*760	1860*980*760	1860*980*760	1860*980*760
	Gross weight	161kg	164KG	164KG	164KG

2-2. Main features

(1) Ice-making function

Manual ice maker can satisfy user's different need for ice.

(2) Full width shelf design, more convenience for storing and taking food.

(3) Fuzzy Function

The refrigerator can be automatically adjusted to the best refrigerating condition according to the chamber temperature and ambient temperature without human intervention.

(4) Super large and super luxurious design

The refrigerator has super large capacity, super large refrigerating and freezing chamber, as well as super luxurious inter design.

(5) Fluoride-free, frostless, complete air cooling refrigeration, deep cooling, and rapid freezing.

(6) Defrost and pre-refrigeration

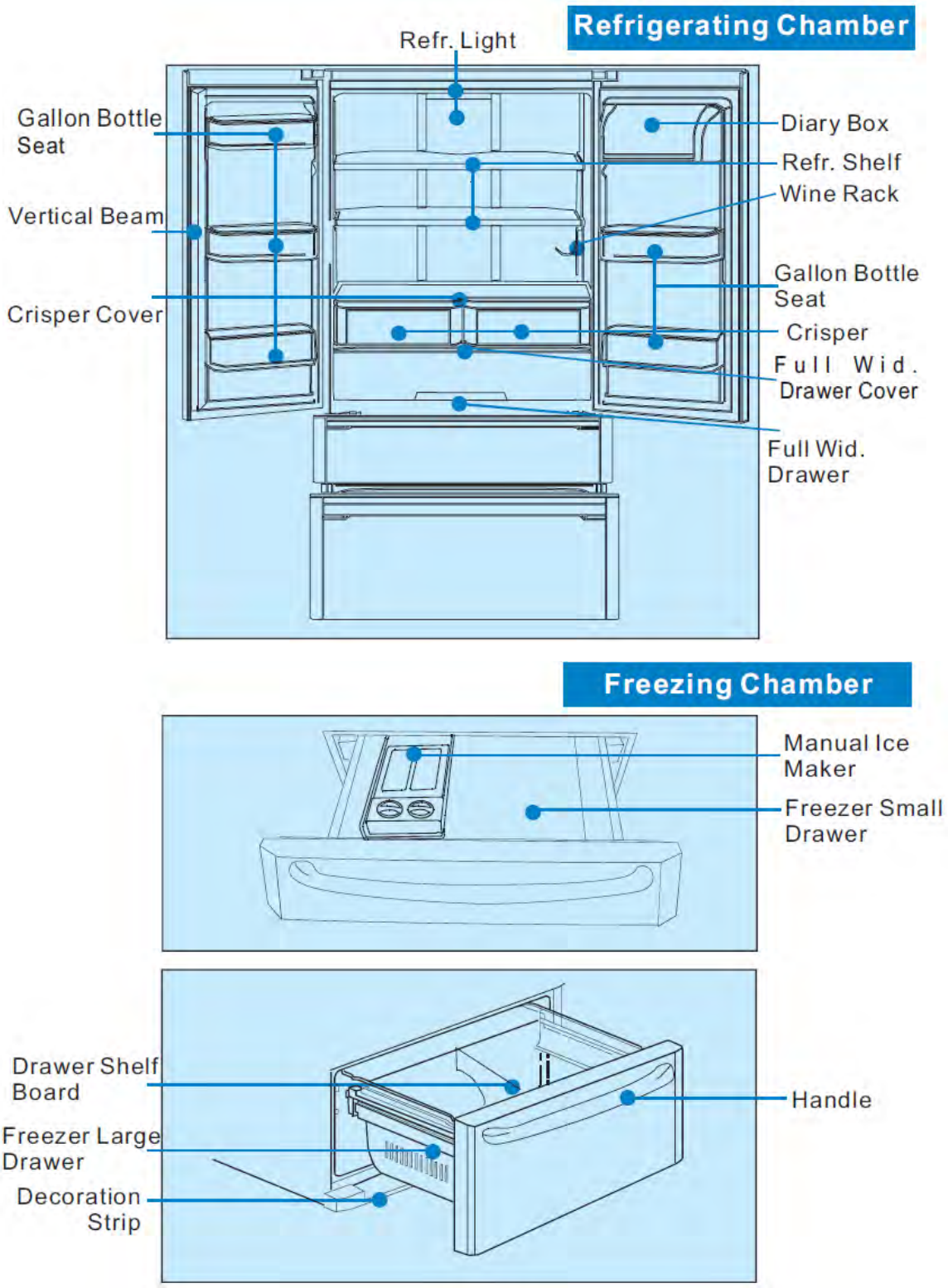
The refrigerator will make judgment on the temperature in the refrigerator before defrosting, and the compressor will automatically and rapidly refrigerate after defrosting.

(7) Equipped with condensing unit, heat dissipation by blower, better refrigeration effect, and long service life of compressor.

(8) Open door alarm, touch-sensitive button, large-screen LCD display.

(9) Drawers have track way. It can be pushed and pulled smoothly.

2-3. External views

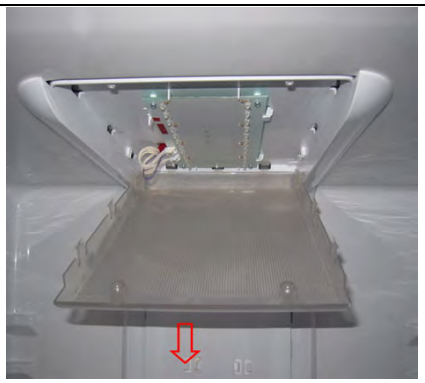


Chapter 3 Disassembly and Installation

3-1. Disassemble the lamp of fridge chamber

The fridge lamp is LED type with low energy consumption and long operation life. The replacement steps are as follows:

(A) Replace the top lamp panel of fridge chamber:

(1) Remove two fixing screws of top lamp cover.	(2) Remove the top lamp cover.
	
(3) Disconnect the connecting terminal, then remove the four fixing crews of lamp panel.	(4) During installation, carry out the operation in the reverse order

(B) Replace the back lamp of fridge chamber:

(1) Remove the top lamp cover firstly. then remove the back lamp cover (back light cover is mounted on the back by clip hook structure)	(2) Remove the lamp panels. There are two back lamp panel. Each lamp panel is fixed by fixing screw and clip hook structure.
(3) During installation, carry out the operation in the reverse order	

3-2. Disassemble the air duct of fridge chamber

(1) Remove the top lamp cover and top lamp panel firstly according to above steps.

(2) Remove the four fixing screws of lamp panel support, then remove the lamp panel support.

(3) After the top lamp panel support is removed, Detach two screws fixing back air duct of fridge chamber.

(4) Pull out the air duct assembly of fridge chamber.

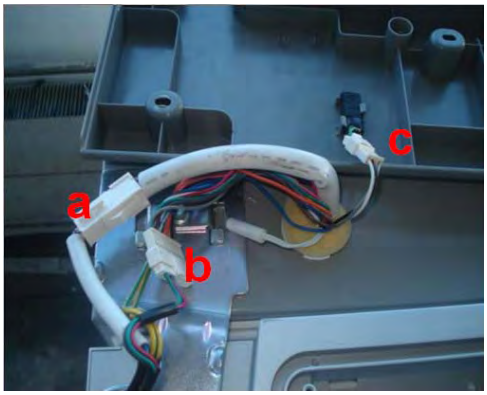
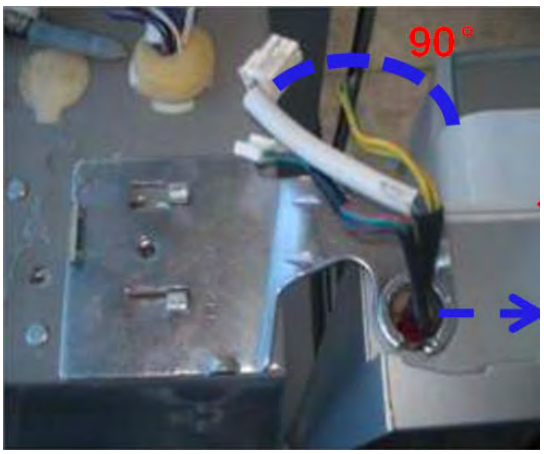
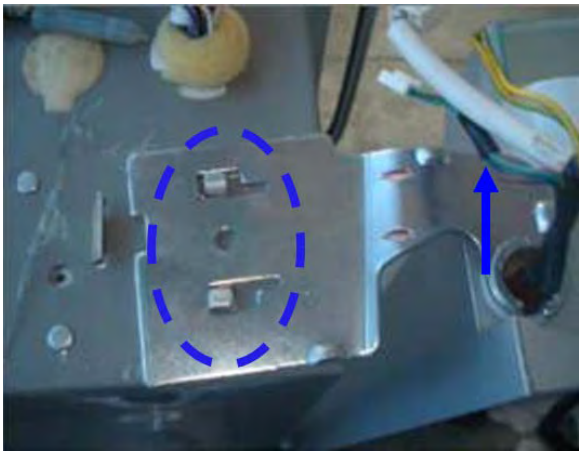
(5) Disconnect the lower wire terminals of the air duct , then detach the fridge air duct.

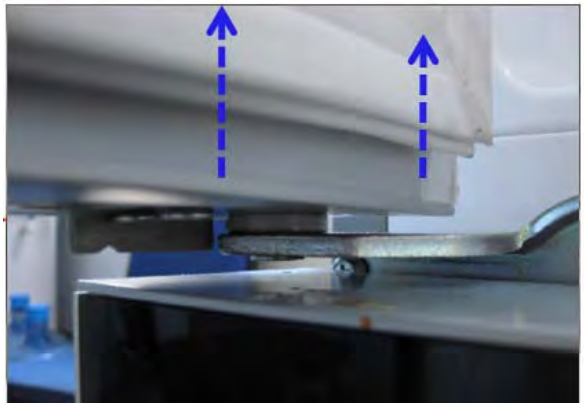
(6) During installation, carry out the operation in the reverse order

3-3. Disassemble the fridge door

3-3-1. Disassemble the fridge door

Take the left fridge door for example in the following steps introduction. (Disassemble the right fridge door can refer to the following similar operation. Fridge door installation can be operated in the reverse order.)

(1) Remove the fixing screws of upper hinge cover, then remove the upper hinge cover.	(2) Disconnect cable connectors (a, b) and humidity sensor terminal (c).
	
(3) Detach the fixing screws for upper hinge.	(4) Detach the U type fixing part for upper hinge.
(5) Open the fridge door to 90° angle, now the door is vertical to the cabinet, then pull the door out in the arrow direction.	（6）When the locating block off the upper hinge, stop pulling the door outward, then lift the door upward to remove it from refrigerator.
	

(7) Hold the side of fridge door using one hand, hold the bottom of fridge door using another hand, then keep the door and the cabinet in 90° degree angle (that is in vertical direction — must assure this point). Then raise the fridge door off the middle hinge, and put the door horizontally on the protective pad.	(8) Take off the anti-friction ring (the white ring in following picture).
	
(9) Please note to put all parts in order and ensure not lost any part, especially the white anti-friction ring.	

3-3-2. Disassemble the automatic door closers of fridge door

(1) Take off fridge door according to above operation steps, take down bottle holders and upper hinge from then fridge door, then remove fridge door from the refrigerator.	(2) Reverse the fridge door to keep the bottom to upward, then detach the three fixing screws as shown.

(3) Take down the door stopper.	(4) Draw out the automatic door closer from the fridge door.

Caution in operation：

1. Must ensure the fridge door and cabinet in 90° degree when disassemble or install the door !
2. When reinstall the automatic door closer, operator must according to the following requirement: Keep the flat surface of shaft (green line) in vertical direction with the red line shown in the following picture.

The fridge door will can't be reinstall in right position if not comply with any one of above operation requirement.

3. Put the fridge door horizontally slightly in order to prevent damaging the automatic door closer which under the bottom of door.

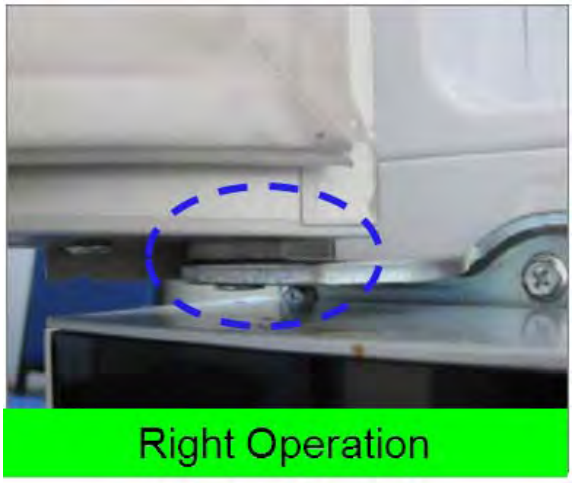
4. When install the fridge door to middle hinge, please ensure the following items:

a. Firstly, note that put the white anti-friction ring into middle hinge shaft before putting the fridge door above the middle hinge.

b. Secondly, let the shaft of automatic door closer aim at the shaft of middle hinge when putting the fridge door above the middle hinge.

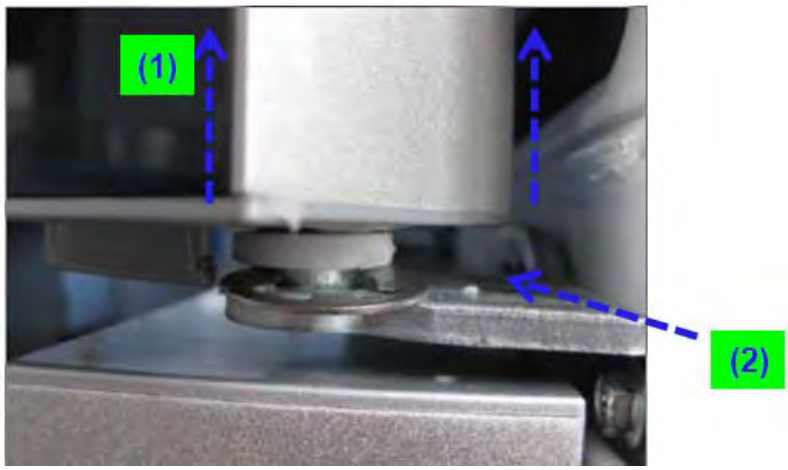
c. Thirdly, must keep the fridge door and cabinet in vertical 90° degree when putting the fridge door above the middle hinge, in order to ensure the door be installed in right position with the middle hinge.

Check the installation after finished operation:

Right Operation:	**Wrong Operation:**
When install the fridge door, keep the door in 90° angle with the cabinet. The door, the anti-friction ring and middle hinge are fitted rightly.	When install the fridge door, no keep the door in 90° angle with the cabinet. The door, the anti-friction ring and middle hinge are not fitted rightly, there is gap between them, that cause the door is not installed in position wholly.
	

5. After finishing door installation, check the following items:
   a. Power on the refrigerator, it can be start.
   b. Can open and close fridge door smoothly.
   c. Check if the left fridge door and the right fridge door are not level.

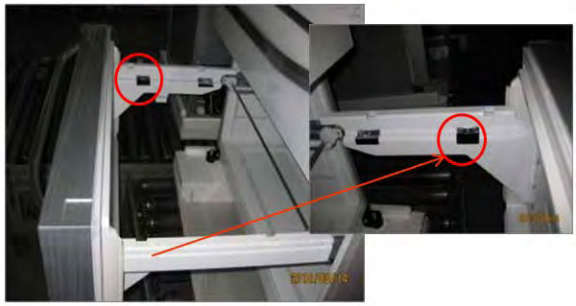
If exist the phenomenon that the left fridge door and the right fridge door are not level, first check the install status between the door and middle hinge according to above instruction 4(C). If the installation operation is OK, the door, the anti-friction ring and middle hinge are not fitted rightly, but the two fridge door are still not level, can level the doors by adding adjusting pad (there are three 1mm adjusting pad with the refrigerator.) .Operation method:

Part used for adjustment use: adjusting pad for middle hinge (can be used to adjust the fridge door level)	Operation: 1. Open and lift the fridge door. 2. Clip the adjusting pad using a pincers to insert it into the shaft of middle hinge. The pad should between the white anti-friction ring and the middle hinge. （In the following demo picture, the pad are not insert into middle hinge wholly.）
	

After above adjustment, check again to ensure door can be opened and closed normally.

3-4. Disassemble the freezing door

Take the operation of big freezing drawer door for example. Disassemble the small freezing door can refer to the following similar operation.

(1) Pull out the big freezing drawer door, lift the plastic drawer front part gently (a), meanwhile passes forward the plastic drawer (b) , makes an effort upwardly behind the plastic drawer (c), take down the plastic drawer.	(2) Detach two screws fixing slideway support bracket.
	
(3) Hold the drawer door and lift it upward, take down the door from the slideway.	(4) After removing drawer door, push slideways into the cabinet.

(5) During door installation, carry out the operation in the reverse order. Do not forget to fix the screws between the slideway support bracket and slideway.

3-5. Disassemble the display panel of left fridge door

Operation for HB21FSAA:

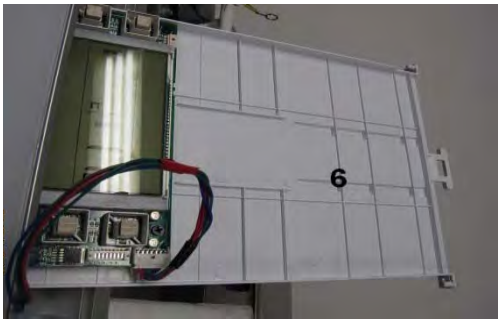
Use sucker to suck the display board at location 1 and 2 to remove it from fridge door.

Operation for HB21FGRAA /HB21FGBAA / HB21FGWAA:

(1) Use screwdriver to detach the screws at location 1 and 2. Then remove the cover 3.

(2) Use screwdriver to detach the screws at location 4 and 5.

(3) Pull out the panel bracket 6 upward, then can take down the display panel



(4) During installation, carry out operation in the reverse order. (Note connector when operation.)

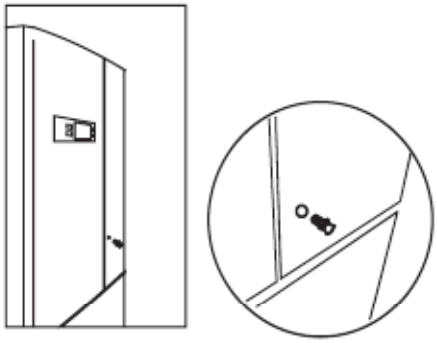
/

3-6. Assemble the handle

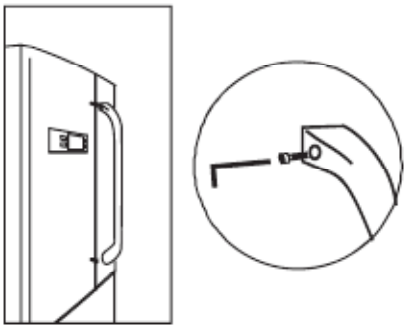
(1) Assemble the fridge door handle

Firstly, insert the handle connectors into the hole of fridge door (Fig. 1).
Then take out the fridge handle, align the hole of handle head to the connector, install the handle to the connector. Use inner-hexagon to fix the side fixing screws on the handle head tightly (Fig. 2).

The handle can be dismantled by reverse steps.



(Fig. 1)

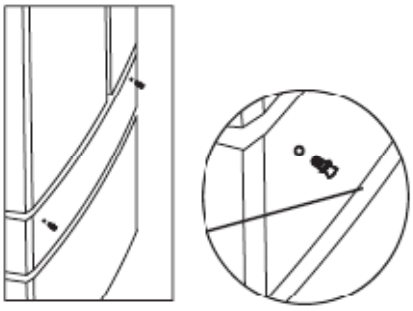


(Fig. 2)

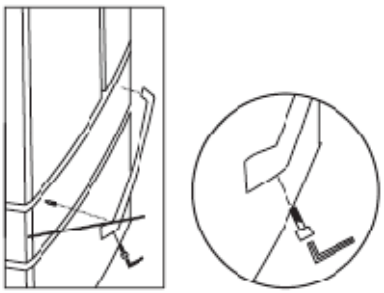
(2)Assemble the freezing door handle

Firstly, insert the handle connectors into the hole of freezing door (Fig. 3).
Then take out the freezing handle, align the hole of handle head to the connector, install the handle to the connector. Use inner-hexagon to fix the side fixing screws on the handle head tightly (Fig. 4).

The handle can be dismantled by reverse steps.



(Fig. 3)

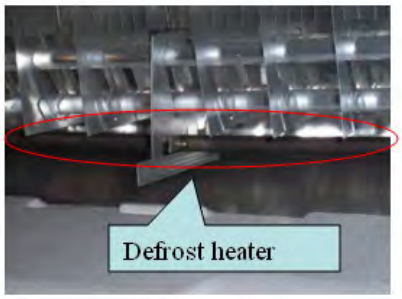


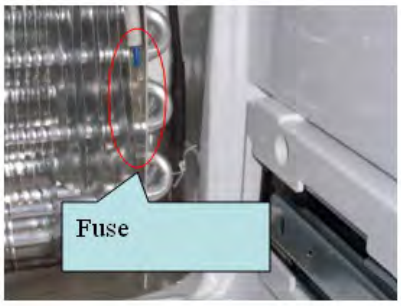
(Fig. 4)

3-7. Defrosting system disassembly and inspection

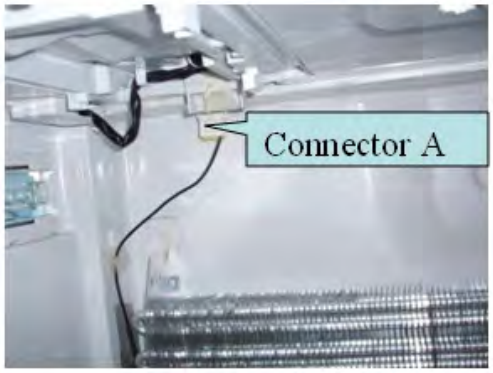
STEP-1: After take out all drawers, lift the air passage of freezer; take down the cover of freezer air passage. Please pay attention to not break the wire of fan motor, and then disconnect the fan connector.

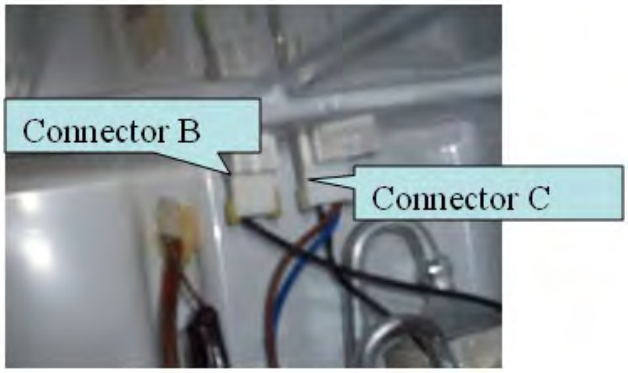
You can find defrost heater, sensor and fuse after take down the cover of freezer air passage..





STEP-2: Disconnect the 2 connectors of heater : A,B and connector C of defrost sensor.



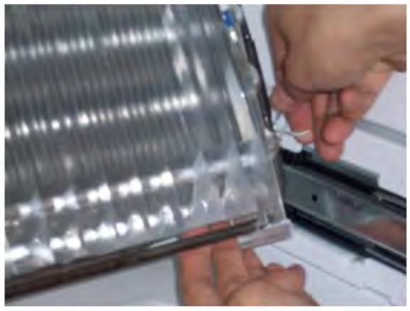


STEP-3: Test the resistance of connector A and B, the normal value is 194Ω , if the heater if failed, please change a new one.

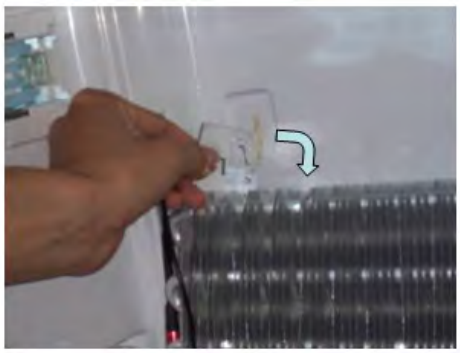
STEP-4: Lift up the evaporator to take the fixing clips out.

Attention: Don't break the pipes of evaporator and avoid being hurt by evaporator.

Disconnect fixing clips to take down the defrost heater.

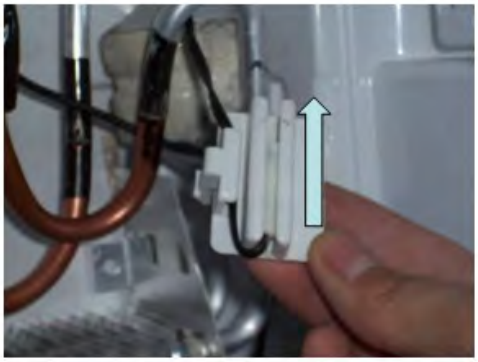


STEP-5: After changing new heater, fix the heater onto evaporator by clips, then fix evaporator onto cabinet.

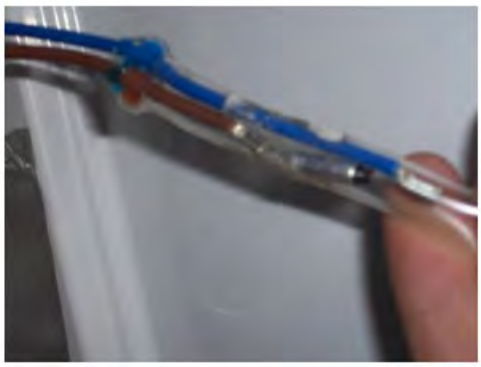


Reconnect the 2 heater connectors

STEP-6: Disassembly the fixing clip of defrost sensor, then push the sensor according to the marked direction to take down the sensor.



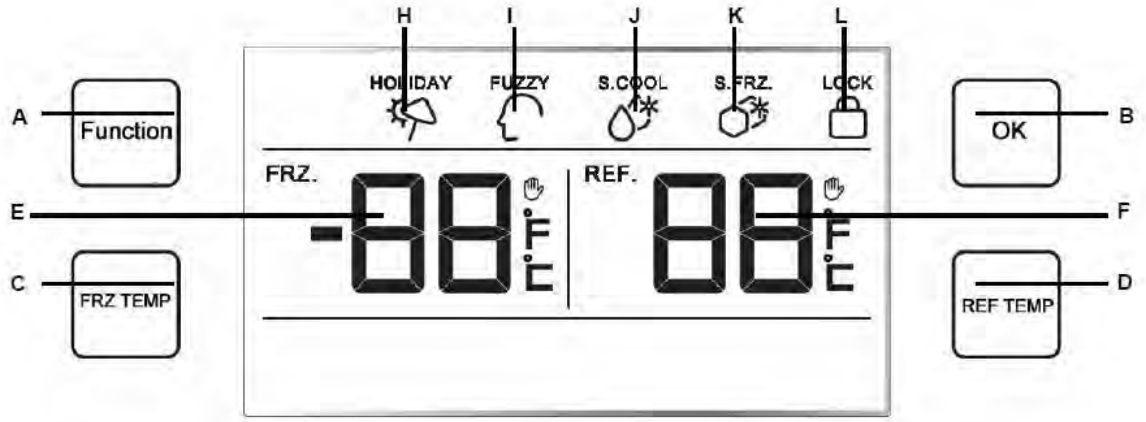
Cut the fixing clip of fuse and check whether the fuse is well, if it is failed, please change a new one.



STEP-7: After examination, first connect the fan connector, then push the cover of air passage to fix it well.

Chapter 4 Control and Display System

4-1. Control and display board



A—Function selection
B-- Function confirmation
C--Freezer temperature control button
D—Fridge temperature control button
E-- Freezer temperature display icon
F-- Fridge temperature displa**y icon**
H—Holiday icon
I—Fuzzy icon
J—Super cooling icon
K—Super freezing icon
L—Lock icon

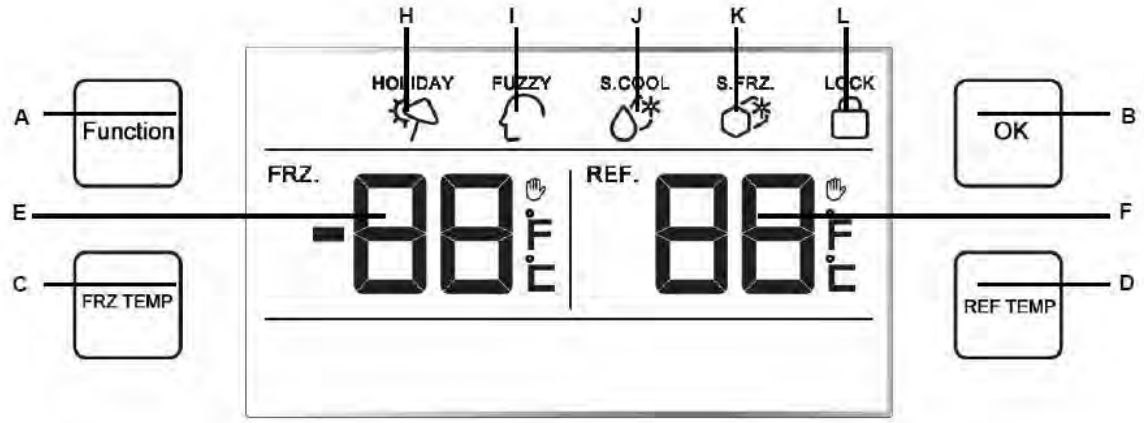
4-2. Holiday function

In the unlocked status, press Function Select Button (A), select the Holiday function, at this time the Holiday Icon (H) is blinking, press down the Function Confirmation Button (B), the Holiday Icon displays, and enter the Holiday function.
If you want to exit the Holiday function, press the Function Confirmation Button (B) and select the Holiday function, and the Holiday Icon (H) is still in blinking, press down the Function Confirmation Button (B), the Holiday Icon will be off, and the Holiday function is exited.

Caution: (1) Before activating the Holiday function, should empty the refrigerating chamber to avoid food spoilage. (2) In the Holiday status, fuzzy and super cooling, the refrigerating temperature control is not available.

4-3. Fuzzy function

In Fuzzy status, refrigerator will adjust the temperature setting automatically according to the ambient temperature and the temperature within the refrigerator. No manual control is required.
In the unlocked status, press Function Select Button (A), select the Fuzzy function, then Fuzzy Icon (I) will blink, press down the Function Confirmation Button (B), the Fuzzy Icon (I) will display and enter the Fuzzy function.
If you want to exit the Fuzzy function, press the Function Select Button (A), select the Fuzzy function, the Fuzzy Icon (I) is still blinking, press down the Function Confirmation Button (B), the Fuzzy Icon (I) will off and the Fuzzy function is exited.



4-4. Super cooling function

Super cooling function is to meet the setting temperature rapidly for refrigerating chamber food storage, it can contribute to a long-term preservation for food. If user put too much food in the refrigerating chamber at a time, user can select to use it.

In the unlocked status, press Function Select Button (A), select the Super Cooling function, at this time the Super Cooling Icon (J) is blinking, press down the Function Confirmation Button (B), the Super Cooling Icon (J) displays, and enter the Super Cooling function.

If you want to exit the Super Cooling function, press the Function Confirmation Button (B) and select the Super Cooling function, and the Super Cooling Icon (J) is still in blinking, press down the Function Confirmation Button (B), the Super Cooling Icon will be off, and the Super Cooling function is exited.

4-5. Super freezing function

Super Freezing function is designed to maintain the nutritional value of food inside the freezing chamber, it will completely freeze the food in a short time.

In the unlocked status, press Function Select Button (A), select the Super Freezing function, at this time the Super Freezing Icon (K) is blinking, press down the Function Confirmation Button (B), the Super Freezing icon (K) displays, and enter the Super Freezing function.

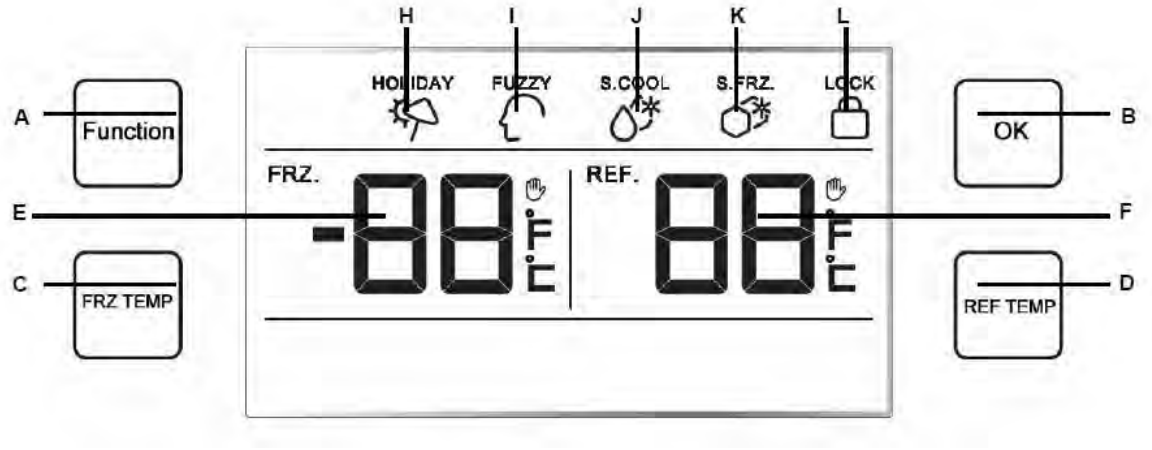
If you want to exit the Super Freezing function, press the Function Confirmation Button (B) and select the Super Freezing function, and the Super Freezing Icon (K) is still in blinking, press down the Function Confirmation Button (B), the Super Freezing Icon (K) will off, and the Super Freezing function is exited.

Caution: Select Super Cooling or Super Freezing functions in Fuzzy status, the Fuzzy status will exit automatically. Additionally, if select Fuzzy function in Super Cooling or Super Freezing status, the Super Cooling or Super Freezing status will exit automatically.

4-6. Lock / Unlock

In unlocked status, press Function Select Button (A), select the Lock function, the Lock Icon (L) blinks, press down the Function Confirmation Button (B), the Lock Icon displays, and enter the locked status.

In the locked status, press down the Function Confirmation Button (B) for 3 seconds, the Lock Icon



(L) will be off and the locked status is exited.

Caution: In locked status, the functional controls of refrigerating temperature, freezing temperature, Holiday, Fuzzy, Super Cooling and Super Freezing are not available.

4-7. Freezing temperature setting

In the unlocked status, press Freezing Temperature Control Button (C), the original freezing chamber setting temperature start to blink. Enter freezing chamber temperature setting status, since then for each single press of this button, the freezing chamber setting temperature is displayed in cyclic form by -14℃, -15℃, -16℃, -17℃, -18℃, -19℃, -20℃, -21℃, -22℃, if no button-pressing operation is initialed over 5 seconds, the blinking will stop and confirm the current temperature setting value.

4-8. Fridge temperature setting

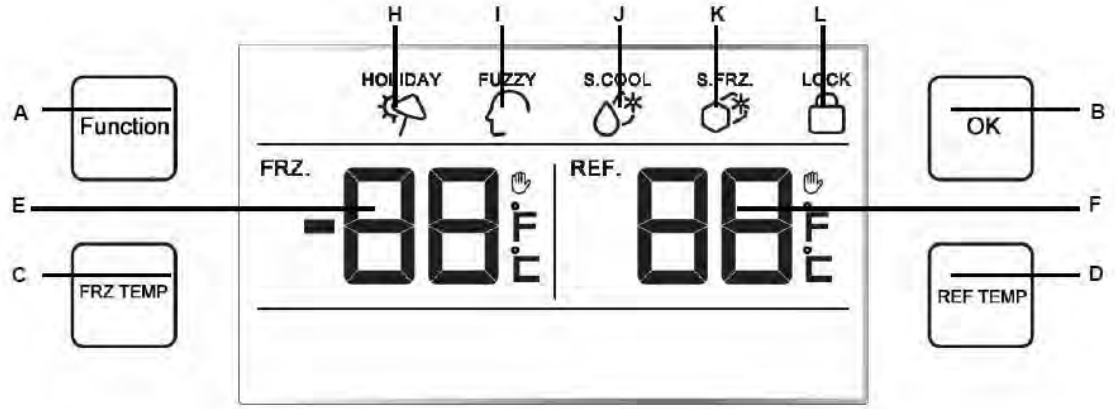
In the unlocked status, press Fridge Temperature Control Button (D), the original freezing chamber setting temperature start to blink. Enter fridge chamber temperature setting status, since then for each single press of this button, the fridge chamber setting temperature is displayed in cyclic form by 09℃, 08℃, 07℃, 06℃, 05℃, 04℃, 03℃, 02℃, 01℃, if no button-pressing operation is initialed over 5 seconds, the blinking will stop and confirm the current temperature setting value.

4-9. Open-door alarm function

When any door is left open for more than 60 seconds or not closed tightly, the refrigerator will sound alarm buzzer at an interval 30 seconds to remind user to close the door.

4-10. Energy-saving display control function

30 seconds after button-pressing operation, display screen backlight and button light will be off automatically, this is in order to save power consumption. When pressing any key or opening any door, it will resume display screen backlight. The corresponding press-button light will activate from button-pressing operation



4-11. Power outage memory function

When refrigerator has a power outage, the instantaneous working status during the outage is memorized. After the power is on, the refrigerator will still run according to the setting tags and function states before the power outage.

Caution: The Lock function is not memorable. The refrigerator is at unlocked status after power recovery.

4-12. Demo mode

Under locked status, press the function confirmation button OK (B) and freezer temperature control button FRZ TEMP (C) at the same time for 3 seconds to active demo mode.

Demo mode can be used for demonstrating refrigerator in market or showroom. Under demo mode, compressor, fan and heater are all not work, the lamp can work normally.

Same above operation under locked status can exit the demo mode.

Chapter 5 Electrical Control Principle

5-1. Overview

The refrigerator belongs to whole no frost air cooling design.
The fridge chamber temperature is controlled by the fridge sensor controlling the switch of the air damper. The freezer chamber temperature is controlled by the freezer sensor controlling the operating of the compressor.

5-2. Fridge electric air damper control

(1) The air damper is controlled with the fridge temperature sensor R SNR.
(2) The air damper is closed from the beginning of defrosting until 15 minutes after the defrosting is finished.
(3) Upon initial powering on or resetting of the control panel, the air damper conducts a close-and-open cycle before acting according to the control conditions in item (1).
(4) The air damper will be forced to conduct an open-and-close cycle if it has been closed for 1 hour. After that, its closing/opening will be controlled by R SNR.
(5) The air damper will automaticlly close when REF. door has been opend over 2 minutes.
(6) When the fridge sensor failure, air damper will work according to fixed cycle: ON 10 minutes, then OFF 15 minutes.

Operation can be used in check air damper: Press refrigerator temperature setting button for 3 seconds under lock status, then the fridge room is closed, and temperature and setting display board go out, fridge air damper is closed.

5-3. Fan control

Control principal of the freezer fan motor:

1. When a fridge food door is opened, the freezer fan motor will operate at high speed and the damper will be full open. After 2 minutes with the fridge door open, the damper will close, but the freezer fan motor will operate according to the compressor function.
2. The freezer fan motor will not operate if the freezer door is open .
3. The freezer fan will not stop running if any one of the fridge chamber and freezer chamber can not reach the setting temperatuer.
4. When the freezer sensor failure, freezer fan will work according to fixed cycle: ON 15 minutes, then OFF 15 minutes.

Condenser cooling fan motor's controlling:

The cooling fan works with the compressor synchronously.

If the running speed of evaporator / Condenser fan motor is lower than 300RPM, or stop running, and or longer than 30 seconds during the run cycle, the appliance will display error code E1/E2. It will come back to normal display if fan motor resume normal condition, or else it keep display error code..

5-4. Vertical girder heater control

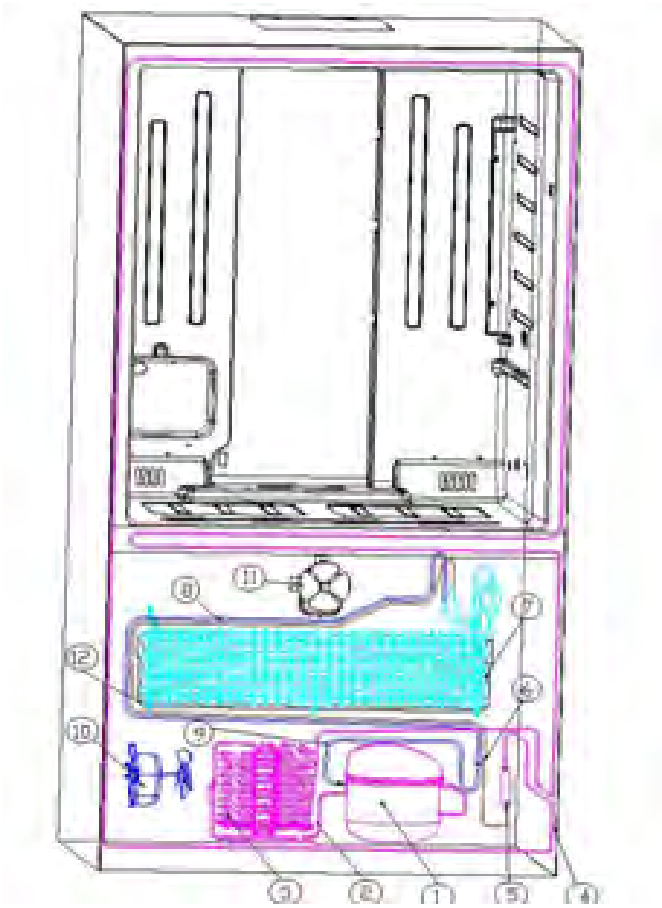
According to different ambient temperature and different humidity, the working time of vertical girder heater are also different. For example, If the ambient temperature is between 30 ℃ to 35 ℃, humidity is between 60% to 70%, the vertical vertical girder heater work 25 seconds per minute.

5-5. Defrost control

The refrigerator control the defrost start based on different compressor accumulated working time and door open times. When the defrost sensor reaches +7ºC, refrigerator stop defrost.
If the defrost heater working time has reach 120 minutes, but defrost sensor failing to reach +7℃, refrigerator will stop defrost and error code ED will be displayed in display area.
When the defrost sensor failure, defrost heater will work 60 minutes and then stop work in every defrost cycle.

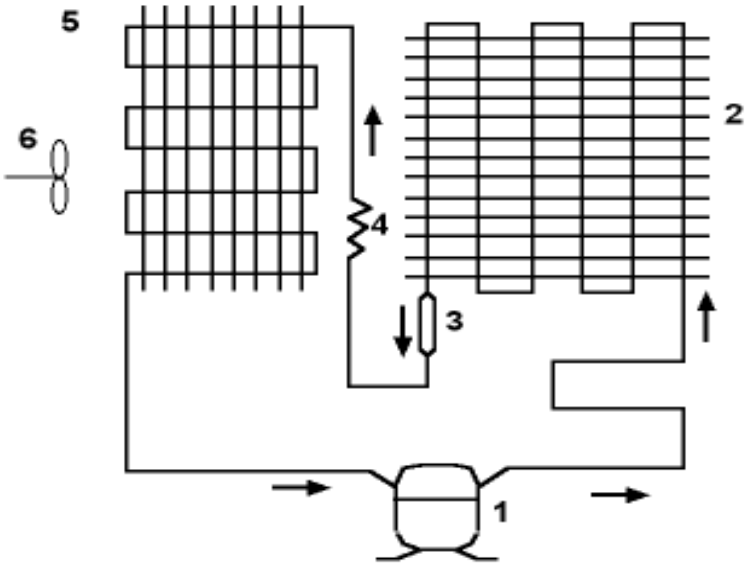
Chapter 6 Cooling System Principle

6-1.Cooling system flow scenograph



(1) Compressor
(2) Connector pipe
(3) Condenser
(4) Anti-dew tube
(5) Drier filter
(6) Capillary
(7) Evaporator
(8) Suction pipe
(9) Connector pipe
(10) Condenser cooling fan
(11) Freezing fan
(12) Defrost heater

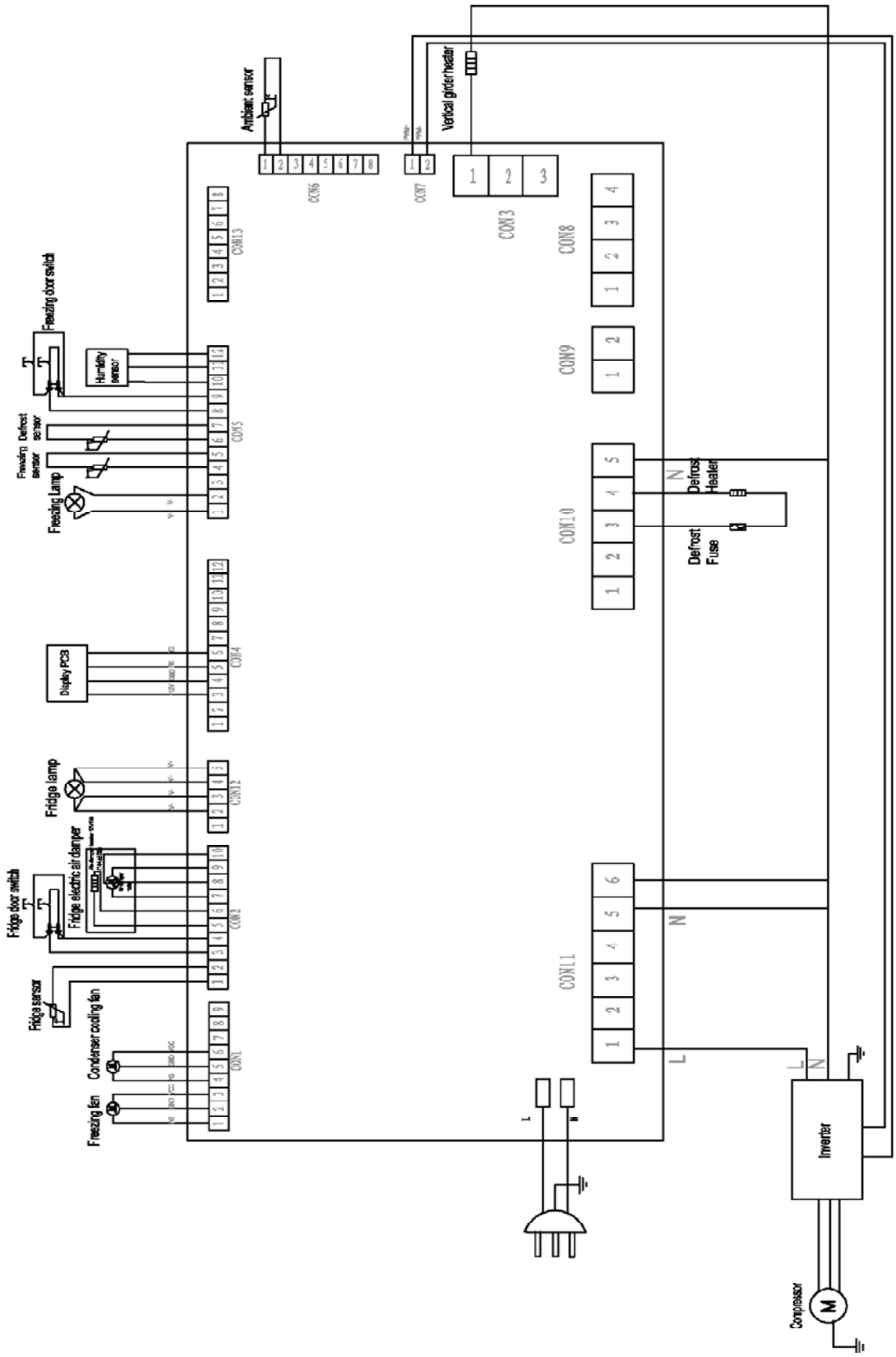
6-2.Cooling system flow chart



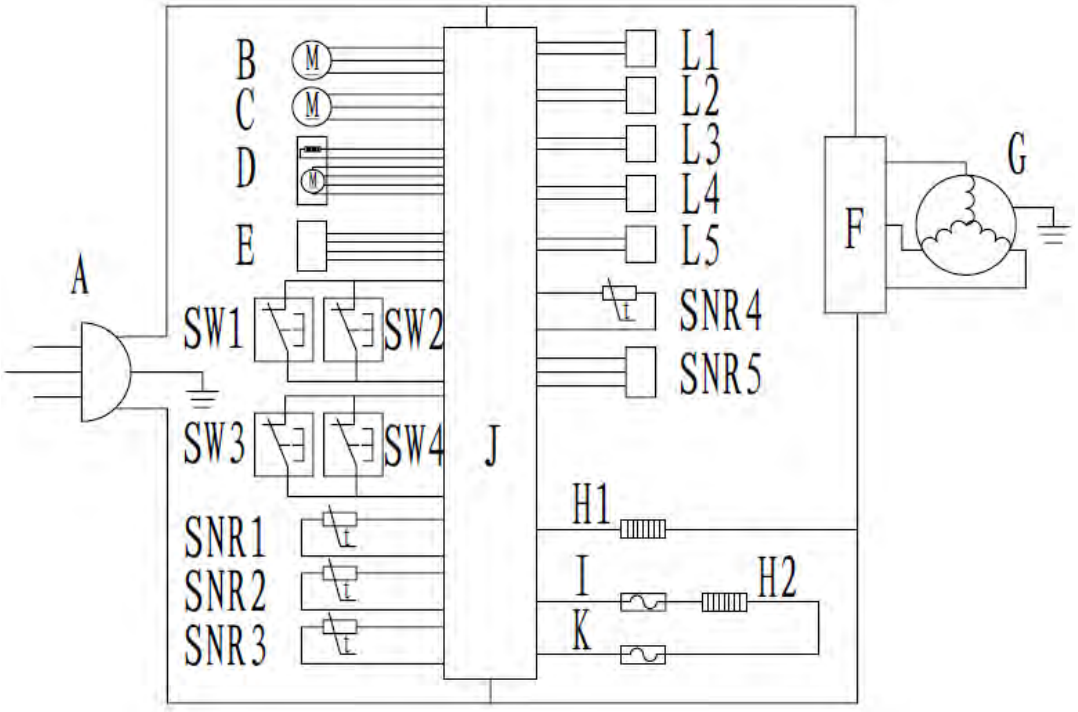
(1) Compressor
(2) Condenser
(3) Drier filter
(4) Capillary
(5) Evaporator
(6) Freezing fan

Chapter 7 Circuit Diagram

7-1. Main control PCB diagram



7-2. Brief principle diagram



A. Power Plug B. Freezer fan C. Cooling fan D. Damper E. Display board
SW1. Fridge lamp switch 1 SW2. Fridge lamp switch 2 SW3. Freezer lamp switch 1
SW4. Freezer lamp switch 2 SNR1.Fridge sensor SNR2.Freezer sensor
SNR3.Defrost sensor SNR4.Ambient sensor SNR5.Humidity sensor
L1.Fridge lamp 1 L2.Fridge lamp 2 L3.Fridge lamp 3
L4.Freezer lamp 1 L5.Freezer lamp 2 F. Inverter board
G. Compressor I. Fuse 1 J. Control board
K. Fuse 2 H1.Vertical girder heater H2.Defrost heater

Chapter 8 Sensor, Error Code and Self-test Function

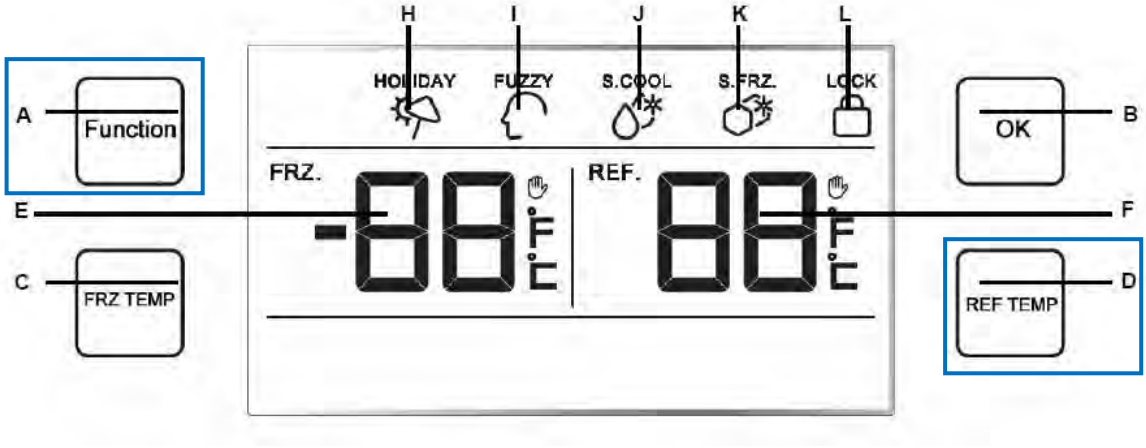
8-1. Sensor position

8-2. Error codes list

NO.	Error description	Error code and display area		Code meaning
		FRE	REF	
1	(RT SNR) Ambient temperature sensor		F2	RT SNR short circuit or open circuit
2	(R SNR) Fridge sensor failure		F3	R SNR short circuit or open circuit
3	(F SNR) Freezer sensor failure	F4		F SNR short circuit or open circuit
4	(D SNR) Defrost sensor failure		F6	D SNR short circuit or open circuit
5	(H SNR) Humidity sensor failure	Eh		H SNR short circuit or open circuit
6	Poor communication		E0	2-minute communication disconnection
7	Freezing fan	E1		Freezing fan is unavailable
8	Cooling fan	E2		Cooling fan is unavailable
9	Defrost system failure	Ed		The temperature feeling by defrost sensor cannot reach 7℃within two hours

8-3. How to display error code

When this refrigerator is in malfunction, the appliance can not display error code automatically.
Under Lock status, press Function button (A) and REF TEMP button (D) at the same time for 3 seconds, after the buzzer sounds, the error code is displayed.
If there are several error codes displayed at a time, the error code of high priority will be displayed priority. Press the key Function (A) to display next error code and repeat the operation for circulating display.
Press Function button (A) and REF TEMP button (D) at the same time for 3 seconds again to exit the error code display



8-4 Self-test function

(1) Under LOCK status, finish the following operation within 5 seconds: press four keys one by one, Function (A) - REF TEMP (D) - OK (B)- FRZ TEMP (C) and then press key Function (A) to enter Test1 mode, the products will enter compulsive starting mode.
(2) Press key Function (A) under Test1 mode for 3 seconds to enter Test2 mode, then the product will enter forced defrosting mode.
(3) Press key Function (A) under Test2 mode for 3 seconds to enter Test3 mode, then the product will enter assistant heater inspection mode.
(4) Press key Function (A) under Test3 mode for 3 seconds to enter Test4 mode (For future use, no function define.)
(5) Under TEST4 mode, press key Function (A) for 3 seconds, the refrigerator will quit Test mode and back to normal.

The following table is the detail about refrigerator self-test function:

MODE	OPERATION	WORKING CONDITION	REMARK
TEST1 (For testing the cooling capability)	Under LOCK status, finish the following operation within 5 seconds: press four keys one by one, Function (A) - REF TEMP (D) - OK (B)- FRZ TEMP (C) and then press key Function (A) to enter Test1 mode, the products will enter forced starting mode.	1) compressor start working 2) freezer fan motor start working 3) cooling fan motor start working 4) defrost heater closed 5) air damper open 90° 6) show T1/T1 at refrigerator/freezer setting of display board	Mode TEST1 continues until exit manual
TEST2 (For testing the defrost system)	Press key Function (A) under Test1 mode for 3 seconds to enter Test2 mode, then the product will enter forced defrosting mode	1) compressor shutdown 2) freezer/cooling fan motor shutdown 3) defrost heater start working 4) vertical girder heater shutdown 5) air damper and it's heater shutdown 6) freezer/refrigerator setting display T2/T2 at display board	When temperature around defrost sensor above 7 degree, appliance will exit <Forced defrosting model>
TEST3 (For testing assistant heater)	Press key Function (A) under Test2 mode for 3 seconds to enter Test3 mode, then the product will enter assistant heater inspection mode.	1) compressor shutdown 2) freezer/cooling fan motor shutdown 3) defrost heater shutdown 4) vertical girder heater start working 5) air damper heater start working 6) freezer/refrigerator setting display T3/T3 at display board	exit the inspection program after 30 minutes and back to normal
TEST4	Press key Function (A) under Test3 mode for 3 seconds to enter Test4 mode	*(No define function in Test4, it is for considering future use.)*	
BACK TO NORMAL	Under TEST4 mode, press key Function (A) for 3 seconds ,the refrigerator will quit Test mode and back to normal	Function back to normal (compressor start to work 7 minutes later)	

Chapter 9 Trouble shooting

Problem	Cause	
Water/moisture/frost in the refrigerator		
Moisture accumulates on the refrigerators inner walls	● Hot and moist climate. ● The door is not closed tightly ● The door is opened too frequently or for too long time	● Accumulation of frost and moisture accelerate in such climate. ● Make sure the refrigerator is level and there is no food or container interfering with the door ● Do not open the door so frequently
Water/moisture/frost on outside surface of the refrigerator		
Moisture accumulates on the refrigerator's outside surface or between two doors	● Damp climate ● The refrigerator door is not closed tightly. This causes mixing of the cold air in the refrigerator with the warm air outside it	● It is normal in damp climate. The moisture will decrease when the humidity drops. ● Make sure the refrigerator is level and there is no food or container interfering with the door
Refrigerator operation		
The compressor does not work	● The refrigerator is in defrosting cycle. ● The refrigerator is not plugged into a power outlet. ● The refrigerator is in OFF state.	● It is normal for an automatic defrosting refrigerator. ● Verify the plug is plugged in the socket firmly. ● Press the "Power" button for 3 second or more to restart the refrigerator or turn the knob from OFF to temperature selection position.
The fridge storage compartment does not work	● The air door cable is not connected properly. ● The fan does not work ● The fridge storage compartment is turned off	● Check if the air door cable is not connected properly and install it correctly if not so. Verify that the air door acts normally with the Fridge ON/OFF key on the display panel ● The fan does not work while the refrigeration air door is open. Please check if the door on-off behind the front decoration strip is installed properly. Reinstall it correctly if not so. ● Turn on the fridge storage compartment manually
The refrigerator runs frequently or runs for too long period	● The indoor or outdoor temperature is high ● The refrigerator has been powered off for a period of time. ● The automatic icemaker is operating. ● The door is opened too frequently or for long periods. ● The door of the fridge / freezer storage compartment is not tightly closed. ● The temperature setting for the freezer storage compartment is too low ● The door gasket of the	● In this case, it is normal for the refrigerator to run longer. ● Normally, it takes 8 to 12 hours for the refrigerator to totally cool down. ● Icemaking process makes the refrigerator to run longer. ● Warm air enters the refrigerator and causes it to start frequently. Please do not open the door so frequently. ● Make sure the refrigerator is level place and there is no food or container interfering with the door. ● Set the temperature higher until satisfactory refrigerator temperature is obtained. It takes 24 hours for the refrigerator temperature to become stable. ● Clean or replace the door gasket.

	fridge/freezer storage compartment is dirty, worn, cracked or mismatched. ● The condenser is dirty.	Leakage gap of door gasket can cause longer running time of the refrigerator in order to maintain desired temperature. ● Clean the condenser.
Too high temperature		
Too high temperature in the fridge/freezer storage compartment	● The door is opened too frequently or for too long periods of time ● Temperature is set too high ● The door is not closed tightly ● The condenser is dirty	● Warm air will enter the refrigerator whenever the door is opened. Try to open the door as infrequently as possible. ● Reset the temperature. ● Make sure the refrigerator is on a level surface and there is no food or container interfering with the door. ● Clean the condenser.
The temperature in the freezer storage compartment is too high while the temperature in the fridge storage compartment is OK	● The temperature is set too high	● Set the freezer temperature lower. It takes 24 hours for the temperature of the refrigerator to become stable.
The temperature in the fridge storage compartment is too high while the temperature in the freezer storage compartment is OK	● The temperature is set too high	● Set the fridge temperature lower. It takes 24 hours for the temperature of the refrigerator to become stable.
Bad odors in the refrigerator		
The inside of the refrigerator is dirty	● The inside of the refrigerator needs cleaning ● Food with strong odor is stored in the refrigerator	● Clean the internal of the refrigerator ● Wrap the food tightly.
If you hear...		
Beeps	● The fridge storage compartment door is open ● The temperature in the freezer storage compartment is too high	● Close the door or silence the alarm manually ● The alarm is normal when it is first started due to relatively higher temperature.
Abnormal sound	● The refrigerator is not located on a level surface ● The refrigerator touches some object around it	● Adjust the feet to level the refrigerator. ● Remove objects around it.
Slight sound similar to that of flowing water	● It is the sound of the refrigerating system	● Normal.
Heating of cabinet	● The de-dew tube is de-dewing	● It is a process to prevent dewing. It is a normal phenomenon.

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